

CKC

PRELIMINARY SPECIFICATION - HIGH MAGNIFICATION

1-023-A-661

LENSES FOR BRIEFING PRINT ENLARGER

1. EQUIPMENT APPLICATION

These lenses are designed to extend the magnification range of the Briefing Print Enlarger while retaining the ability to reproduce detail from high quality black and white aerial photographic negatives.

2. DESCRIPTION

2.1 The set of high magnification lenses consists of two objective lens - focus barrel assemblies and their respective condenser-light source assemblies.

2.2 One objective-condenser combination provides magnifications in the range from 60X to 97X. The second objective-condenser combination provides magnifications in the range from 95X to 153X. These lenses are mounted in the same type of precision focusing assembly as the other BPE lenses.

2.3 The required focus setting for any desired magnification within the individual lens capability is displayed in the appropriate window of the Easel Drive Assembly. Provision is made in these lenses and their mating condenser assemblies to actuate related switches which will illuminate the correct focus data window when a lens-condenser set is installed in the enlarger. As with the other enlarger lenses, focus is set manually on these lenses.

2.4 Each condenser-light source assembly is equipped with its own 300 watt projection lamp. This lamp is identical to that used in all the other condenser assemblies for the enlarger.

3. PERFORMANCE

3.1 The nominal values of magnification (M), effective focal length (EFL), and relative aperture (f-number), are given in Table 1 for the two lenses. The magnification achieved for a given negative-to-print distance (OAC) may vary $\pm 2\%$ for various lenses of a production lot. The magnification value shown in the focus table may be in error by $\pm 1\%$ from the true value.

3.2 The Minimum Axial Resolution specification of Table 1 shall be applied to tests made as follows.

3.2.1. The test target material shall have at least 100:1 contrast, be in the USAF 1951 format and provide 50 to 800 lines/mm. The material shall have been exposed on Kodak Type 649GH film on the Microscope Resolution Target Camera at the contractor's facility. The test target polarity will be clear lines in a high density background.

Declass Review by NGA.

APPROVAL

SHEET 2 OF 4

DATE RELEASED:

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TABLE 1

High Magnification Lens Specifications for Nominal Magnification, EFL,
and f-number and for Minimum Axial Resolution and Field Diameter

Nominal Magnification		EFL (Inches)	Lens f- Number	Minimum Axial Resolution		Minimum Field Diameter	
M (Diameter)	OAC (Inches)			Negative (1/mm)	Print (1/mm)	Negative (Inches)	Print (Inches)
60.0	50.	0.81	f/2.6	650	11	.507	30.4
74.8	62.				9		38.0
97.0	80.				7		49.1
95.0	50.	0.52	f/2.2	740	8	.320	30.4
119.0	62.				6		38.0
153.0	80.				5		49.0

APPROVAL

SHEET 3 OF 4
DATE RELEASED:

EKCo	PRELIMINARY SPECIFICATION - HIGH MAGNIFICATION LENSES FOR BRIEFING PRINT ENLARGER	DWG. NO. 1-023-A-661
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3.2.2. Test prints on the BPE are to be exposed on Kodak Fine Grain Positive Film (or on equal product) with a Wratten 98 (W98) blue filter in the lamphouse filter position.

3.2.3. Resolution performance will be judged as the highest spatial frequency in the test target whose image is visually resolved in the print. The criteria for judgment of image resolution shall be those of Paragraph 3.6.2. of MIL-STD-150A.

3.2.4. An exposure series may be exposed to obtain the optimum resolving power. The lens focus setting shall be that predicted by the focus table.

3.3 The off-axis resolving power shall be measured at the same focus and exposure which provided the axial resolution data and to the same criteria. The same type of test target material shall be used, preferably on a common piece of film. The arithmetic average of radial and tangential resolving power for four radii of the field of view, separated by 90° at a radial distance of 70% of the full field radius, shall be no less than 70% of the resolution measured on-axis.

3.4 The Minimum Field Diameter at the negative, as specified in Table I, is primarily controlled by the various aperture diameters in the condenser system. The field diameter at the print is determined by the field diameter at the negative and the magnification. The specified field diameter at the print shall be measured with the negative-to-print distance adjusted to produce the corresponding magnification given in the first column of Table I.

3.5 The log illuminance in the projected image of an open gate shall not decrease more than 0.30 below that on the axis at a point 0.8 of the maximum field radius from the axis.

APPROVAL

SHEET 4 OF 4

DATE RELEASED:
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REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL

APPROVAL

SHEET 1 OF 4
TOTAL SHEETS:
DATE RELEASED: